

## DDC FUNCTION BLOCK LOGIC SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	<b>OUTPUT POINT</b> - TRANSMITS A VALUE FROM THE FB TO A PHYSICAL OUTPUT CHANNEL ON THE CONTROLLER. DESCRIPTOR - CONTROLLER ADDRESS, POINTNAME AND POINT TYPE AO - ANALOG OUTPUT DO - DIGITAL OUTPUT		<b>PID CONTROLLER</b> - PROPORTIONAL, INTEGRAL, DERIVATIVE LOOPS USE STANDARD ALGORITHMS TO CALCULATE AN OUTPUT BASED ON A VARIABLE INPUT. PROPORTIONAL IS BASED ON THE DIFFERENCE BETWEEN THE INPUT AND THE SETPOINT. INTEGRAL IS BASED ON THE TIME THE INPUT DEVIATES FROM THE SETPOINT. DERIVATIVE IS BASED ON THE RATE THE INPUT IS APPROACHING THE SETPOINT. THE PID CAN BE EITHER DIRECT ACTING (DA) OR REVERSE ACTING (RA). IN A DA PID WHEN THE INPUT INCREASES THE OUTPUT INCREASES. IN A RA PID WHEN THE INPUT INCREASES THE OUTPUT DECREASES.
	<b>INPUT POINT</b> - READS A VALUE FROM A PHYSICAL INPUT ON THE CONTROLLER AND CONVERTS FOR USE INSIDE THE FB. DESCRIPTOR - CONTROLLER ADDRESS, POINTNAME AND POINT TYPE AI - ANALOG INPUT DI - DIGITAL INPUT		<b>FLOATING CONTROLLER</b> - OUTPUT WILL INCREASE OR DECREASE INCREMENTALLY AS INPUT DEVIATES FROM SETPOINT. IN A DA CONTROLLER WHEN THE INPUT INCREASES THE OUTPUT INCREASES. IN A RA CONTROLLER WHEN THE INPUT INCREASES THE OUTPUT DECREASES.
	<b>VIRTUAL POINT</b> - ANALOG OR DIGITAL VALUE USED WITHIN A FB OR BROADCAST ACROSS THE LAN.		<b>RESET CONTROLLER</b> - USER DEFINED OUTPUT VALUE WILL RESET IN A LINEAR RELATIONSHIP BASED ON USER DEFINED INPUT VALUE.
	<b>DIGITAL WIRE</b> - DIGITAL LOGIC CONNECTION BETWEEN FB'S		<b>SWITCHING RELAY</b> - SWITCHES OUTPUT BETWEEN TWO INPUTS WHEN DIGITAL PILOT INPUT IS ON. SWITCH SHOWN IN NORMAL POSITION
	<b>ANALOG WIRE</b> - ANALOG LOGIC CONNECTION BETWEEN FB'S		<b>DEADBAND SWITCHING RELAY</b> - DIGITAL OUTPUT CHANGES WHEN INPUT VALUE RISES/FALLS ABOVE/BELOW SETPOINT 1 (SP1). DIGITAL OUTPUT RESTORES TO NORMAL WHEN INPUT RISES/FALLS ABOVE/BELOW SETPOINT 2 (SP2). SWITCH SHOWN IN NORMAL POSITION
	<b>CONSTANT</b> - CONSTANT VALUE INPUTS		<b>LOGICAL IF EXPRESSION</b> - THE OUTPUT IS ON IF THE INPUT MEETS THE CONDITION OF THE SETPOINT.
	<b>GRAPHIC INTERFACE</b> - VALUE APPEARS ON GRAPHIC SCREEN		<b>RAMP CONTROLLER</b> - LIMITS THE RATE OF CHANGE OF AN OUTPUT ON AN INCREASE IN VALUE OR A DECREASE IN VALUE. CHNG% - % OF TOTAL MAXIMUM OUTPUT VALUE ALLOWED FOR OUTPUT CHANGE # = TIME IN SECONDS MAX = MAXIMUM OUTPUT VALUE MIN = MINIMUM OUTPUT VALUE
	<b>ALARM &amp; PRIORITY</b> - TRANSMITS AN ALARM AND ALARM PRIORITY TO APPROPRIATE DEVICES.		<b>TIMER</b> - OUTPUT IS ON FOR A USER SPECIFIED TIME AFTER INPUT CHANGES FROM OFF TO ON
	<b>MESSAGE AND NUMBER</b> - TRANSMITS A MESSAGE AND MESSAGE NUMBER TO APPROPRIATE DEVICES.		<b>AUTOMATIC TIME SCHEDULER</b> - INCLUDES SCHEDULES ENTERED INTO CONTROLLER FOR 7 DAY SCHEDULING WITH HOLIDAYS AND OVERRIDE SCHEDULES. INCLUDES OVERRIDE INPUT FOR UNSCHEDULED OVERRIDE. OUTPUTS REFERENCE FLAGS CAN INCLUDE : HEATING SETBACK, COOLING SETBACK, AND UNOCCUPIED
	<b>TREND</b> - ESTABLISHES TREND IN CONTROLLER.		<b>OPTIMUM START/STOP TIME SCHEDULER</b> - INCLUDES SCHEDULES ENTERED INTO CONTROLLER FOR 7 DAY SCHEDULING WITH HOLIDAYS AND OVERRIDE SCHEDULES. INCLUDES OPTIMUM START STOP ROUTINE. OUTPUTS REFERENCE FLAGS CAN INCLUDE : WARM-UP, COOL-DOWN, HEATING SETBACK, COOLING SETBACK, AND UNOCCUPIED. INCLUDES OVERRIDE INPUT (OVR) FOR UNSCHEDULED OVERRIDE
	<b>RUN TIME MONITOR</b> - ACCUMULATES RUNTIME FOR DIGITAL OUTPUT AND CONVERTS TIME TO HOURS.		<b>CALCULATION BLOCK</b> - OUTPUT IS EQUAL TO CALCULATION USING INPUT(S). EQUATION CAN BE MATHEMATICAL OR A PREDEFINED INDUSTRY STANDARD ALGORITHM (ie. CFM, VELOCITY PRESSURE, ENTHALPY, DEW POINT ETC.)
	<b>REFERENCE FLAG</b> - USED AS CONNECTION TO FB'S BY REFERENCE INSTEAD OF WIRES.		<b>HIGH SELECTOR</b> - SELECTS HIGHER OF INPUT VALUES
	<b>DIGITAL AND GATE</b> - OUTPUT IS ON IF ALL INPUTS ARE TRUE		<b>LOW SELECTOR</b> - SELECTS LOWER OF INPUT VALUES
	<b>DIGITAL OR GATE</b> - OUTPUT IS ON IF ANY INPUT IS TRUE.		<b>AVERAGING BLOCK</b> - MATHEMATICALLY AVERAGES INPUT VALUES.
	<b>DIGITAL EXCLUSIVE OR GATE</b> - OUTPUT IS ON IF ONLY ONE INPUT IS TRUE.		<b>PROOFING MODULE</b> - GENERATES VALUES BASED ON A COMPARISON OF COMMAND AND MONITORING INPUTS. DLY - PROOFING DELAY PERIOD MTR - MONITOR (INPUT FOR PROOF) COM - COMMAND (INPUT FOR PROOF) RST - RESET (IF LATCHING IS USED) ALM - (ON WHEN MONITOR INPUT IS NOT EQUAL TO COMMAND INPUT) NML - OUTPUT IS ON WHEN MONITOR AND COMMAND INPUTS ARE ON AND NORMAL CONDITIONS ARE MET
	<b>INVERSE (NOT)</b> - IF INPUT = ON, OUTPUT = OFF; CONVERSELY IF INPUT =OFF, OUTPUT =ON		<b>TIME AVERAGE BLOCK</b> - OUTPUT IS EQUAL TO SUM OF INPUTS FROM USER SPECIFIED PREVIOUS TIME PERIOD (OR NUMBER OF SCANS) TO CURRENT TIME (OR SCAN) DIVIDED BY NUMBER OF DISCRETE POINTS IN THE SUMMATION PERIOD. OUTPUT IS A ROLLING TIME BASED AVERAGE OF THE INPUT VALUE.
	<b>LATCH OFF</b> - OUTPUT IS OFF WHENEVER INPUT IS ON. OUTPUT REMAINS OFF UNTIL RESET CHANGES FROM OFF TO ON.		<b>STAGER BLOCK</b> - OUTPUT IS EQUAL TO SUM OF REQUESTS FROM USER SPECIFIED INPUTS. ROTATION SHALL BE DETERMINED BY USER DEFINED PARAMETERS. EACH INDIVIDUAL OUTPUT CAN BE LOCKED OUT BY USER DEFINED INDIVIDUAL INPUTS. LOCKED OUT OUTPUTS SHALL BE SKIPPED IN ROTATION. (SEE SEQUENCE OF OPERATION FOR DETAILS)
	<b>LATCH ON</b> - OUTPUT IS ON WHENEVER INPUT IS ON. OUTPUT REMAINS ON UNTIL RESET CHANGES FROM OFF TO ON.		<b>LEAD/STANDBY BLOCK</b> - ON RUN COMMAND, LEAD OUTPUT IS SELECTED. LEAD OUTPUT CAN BE SWAPPED MANUALLY OR BY A TIME SCHEDULE. WHEN THE LEAD EQUIPMENT FAILS, THE STANDBY OUTPUT IS SELECTED. (SEE SEQUENCE OF OPERATION FOR DETAILS)
	<b>ON/OFF DELAY TIMER</b> - AFTER INPUT IS ON, OUTPUT IS ON/OFF AFTER A PREDETERMINED TIME (#) HAS ELAPSED.		
	<b>CYCLE DELAY TIMER</b> - WHEN SET TIME HAS ELAPSED, THE FIRST TIME INPUT IS ON, OUTPUT IS ON AND TIMER RESETS. BEFORE SET TIME HAS ELAPSED, OUTPUT IS OFF WHEN INPUT IS OFF. IF INPUT GOES FROM OFF TO ON BEFORE SET TIME HAS ELAPSED, OUTPUT WILL REMAIN OFF.		
	<b>POWER FLAG</b> - ON WHEN CONTROLLER IS INITIALLY POWERED ON AND NO PHASE LOSS IS DETECTED		
	<b>FLIP FLOP</b> - CHANGE STATE OF OUTPUT WHEN INPUT CHANGES FROM OFF TO ON; OUTPUT SET TO OFF WHEN RESET (R) GOES CHANGES FROM OFF TO ON		
	<b>SETPOINT OPTIMIZATION</b> - RESET OF OUTPUT FROM A MAXIMUM VALUE TO A MINIMUM VALUE BASED ON VALUES OR REQUESTS) DB - DEAD BAND HI - INCREMENT/DECREMENT VALUE HI - MAXIMUM RESET VALUE LO - MINIMUM RESET VALUE		
	<b>SAMPLE &amp; BUMP</b> - CHANGE IN OUTPUT (WITH DEFINED MINIMUM & MAXIMUM VALUES) BY A DEFINED AMOUNT WHEN INPUT DEVIATES FROM SETPOINT (SP) BY A DEFINED AMOUNT AT A DEFINED INTERVAL. I - INPUT O - OUTPUT MX - MAXIMUM OUTPUT MN - MINIMUM OUTPUT INTVL - INTERVAL > +IE, +OA - WHEN INPUT RISES ABOVE SETPOINT BY AMOUNT '+IE', OUTPUT IS INCREASED BY AMOUNT '+OA' < -IE, -OA - WHEN INPUT FALLS BELOW SETPOINT BY AMOUNT '-IE', OUTPUT IS REDUCED BY AMOUNT '-OA'		

LEGEND	
WIRING DESIGNATIONS	
- - - - -	NEW WIRING
_ _ _ _ _	EXISTING WIRING

## CONTROL SYMBOLS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	DDC POINT DESCRIPTOR WITH NAME AI - ANALOG INPUT DI - DIGITAL INPUT AO - ANALOG OUTPUT DO - DIGITAL OUTPUT		DISCONNECT SWITCH
	TEMPERATURE SENSOR WITH AVERAGING ELEMENT		CONTROL TRANSFORMER
	TEMPERATURE SENSOR WITH SINGLE POINT ELEMENT		RELAY COILS
	TEMPERATURE SENSOR WITH PIPE WELL		FUSE
	SPACE TEMPERATURE SENSOR		THERMAL OVERLOAD
	CARBON DIOXIDE DUCT SENSOR		NORMALLY OPEN AND NORMALLY CLOSED CONTACTS
	CURRENT SENSOR		HAND-OFF-AUTO SELECTOR SWITCH
	SMOKE DETECTOR		WIRING DESIGNATION. (NO. OF HATCHES INDICATES NO. OF CONDUCTORS)
	DIFFERENTIAL PRESSURE SWITCH		WIRING CONNECTION
	WATER FLOW SWITCH		ON-OFF SELECTOR SWITCH
	TWO WAY CONTROL VALVE		THREE WAY CONTROL VALVE
	DAMPER ACTUATOR		LIMIT SWITCH
	AIR DIFFERENTIAL PRESSURE TRANSMITTER (0 - 5" RANGE)		CONTROL DAMPER
	VARIABLE SPEED DRIVE		HYDRONIC DIFFERENTIAL PRESSURE TRANSMITTER
	FREEZESTAT		HYDRONIC FLOWMETER
	AIRFLOW MEASURING STATION		THERMOSTAT
	TEMPERATURE SENSOR PIPE STRAP		HYDRONIC STATIC PRESSURE TRANSMITTER

## ABBREVIATIONS

ALM	ALARM	NC	NORMALLY CLOSED
AH	AIR HANDLER	NO	NORMALLY OPEN
BLDG	BUILDING	OA	OUTSIDE AIR
C	COMMON	OVRD	VERRIDE
CL	COOL	RA	RETURN AIR
CHPS	CHILLED WATER PUMP, SECONDARY	REQ	REQUEST
CHWP	CHILLED WATER PUMP	RF	RETURN FAN
CHWR	CHILLED WATER RETURN	RLF	RELIEF FAN
CHWS	CHILLED WATER SUPPLY	S/S	START / STOP
CW	CONDENSER WATER	SA	SUPPLY AIR
CWP	CONDENSER WATER PUMP	SD	SMOKE DETECTOR
CWR	CONDENSER WATER RETURN	SEC	SECONDARY OR SECONDS
CWS	CONDENSER WATER SUPPLY	SF	SUPPLY FAN
DD	DOWN-DUCT	SCHWR	SECONDARY CHILLED WATER RETURN
DP	DIFFERENTIAL PRESSURE	SCHWS	SECONDARY CHILLED WATER SUPPLY
EF	EXHAUST FAN	SHWR	SECONDARY HOT WATER RETURN
FBK	FEEDBACK	SHWS	SECONDARY HOT WATER SUPPLY
FC	FAN COIL	T	TEMPERATURE
HOA	HAND - OFF - AUTOMATIC	TB	TERMINAL BOX
HT	HEAT	TW	TEMPERED WATER
HWP	HOT WATER PUMP	TWP	TEMPERED WATER PUMP
HWPS	HOT WATER PUMP, SECONDARY	TWR	TEMPERED WATER RETURN
HWR	HOT WATER RETURN	TWS	TEMPERED WATER SUPPLY
HWS	HOT WATER SUPPLY	VP	VELOCITY PRESSURE
ISO	ISOLATION	VSD	VARIABLE SPEED DRIVE
MA	MIXED AIR		